

## Singapore Management University Institutional Knowledge at Singapore Management University

---

Knowledge@SMU

Office of Research & Tech Transfer

---

12-2010

# Friendships, trust and advertisers: The art of mining social networks

Knowledge@SMU

Follow this and additional works at: <https://ink.library.smu.edu.sg/ksmu>

Part of the [Technology and Innovation Commons](#)

---

### Citation

Knowledge@SMU. Friendships, trust and advertisers: The art of mining social networks. (2010). Knowledge@SMU.

**Available at:** <https://ink.library.smu.edu.sg/ksmu/391>

This Journal Article is brought to you for free and open access by the Office of Research & Tech Transfer at Institutional Knowledge at Singapore Management University. It has been accepted for inclusion in Knowledge@SMU by an authorized administrator of Institutional Knowledge at Singapore Management University. For more information, please email [libIR@smu.edu.sg](mailto:libIR@smu.edu.sg).

(<http://knowledge.smu.edu.sg>)

## Friendships, trust and advertisers: The art of mining social networks

Published: December 01, 2010 in Knowledge@SMU

Share [Tweet](#)

Depending on who you meet, 'social networking' can draw two kinds of reactions. For the small but well-informed crowd weaned on the first dot-com wave, a been-there-done-that reaction is expected. The techies and tech-wannabes, on the other hand, might respond enthusiastically and boast about their various profiles, avatars, 'friends', apps, and so on. And for the rest caught in-between? Perhaps a shrug, followed by a "so what?"

Yet, one would be hard pressed to find a person between 15-35 years old who has not heard of social media sites like Facebook, Twitter, MySpace and so forth. Facebook alone counts more than 550 million users as of mid-2010 and the number is still growing. Put into context, these 550 million users, if regarded as a country, would be the third largest on the planet – after China and India; just ahead of America.

Clearly, the latent potential of social networking in business, government and society deserves a lot more time and research. It was therefore apt that a group of academics and industry practitioners gathered to share their knowledge on social network mining at a [workshop](http://www.sis.smu.edu.sg/seminar/workshop_social_network_mining.htm) ([http://www.sis.smu.edu.sg/seminar/workshop\\_social\\_network\\_mining.htm](http://www.sis.smu.edu.sg/seminar/workshop_social_network_mining.htm)) organised by Singapore Management University's [School of Information Systems](http://www.sis.smu.edu.sg/) (<http://www.sis.smu.edu.sg/>). There, participants shared their take on the issues and implications that surround this fast-evolving phenomenon.

[Professor Jeffrey Xu Yu](http://www.se.cuhk.edu.hk/people/yu.html) (<http://www.se.cuhk.edu.hk/people/yu.html>) of the Chinese University of Hong Kong started off the proceedings of the day with a discussion on the applicability of graph theory to address problems of nodes on the internet being reachable from each other. Each of these queries, known as 'Reachability Query', tries to use classic shortest distance determination via search trees based on its location on the graph to find a pattern matching over the connected set of nodes in the network modelled as a graph.

In the context of mining the social network on the internet by modelling the connected nodes in it as a graph, the method tries to answer questions such as: which nodes are connected to which other nodes on a social network? How many hops does it take for one node to reach another?

### That's what friends are for

Lending an industry practitioner's perspective is Bangalore-based Vineet Chaoji, senior associate scientist at [Yahoo! Lab in India](http://bangalore.yahoo.com/labs) (<http://bangalore.yahoo.com/labs>). Part of his job is to analyse and find patterns within Yahoo's own network of users, many of whom already have informal social networks.

Chaoji presented a case study from Yahoo! which studies the use of social influence for targeting advertisements to a small network of friends as a means for getting users to sign up to a paid service of PC to phone calling.

The study was a means of getting traction to increase user adoption for a paid premium service, by observing how a network of influences could better target their constituencies of followers or influenced. "As you probably know well by now; social media has the potential of making internet-based marketing much more effective than it now is – which is more like a hit and miss affair," said Chaoji.

Depending on the click-through rates and views of the relevant advertisement, total viewership is usually in the region of 0.1 to 0.001%, or even less of all site visits where advertisements are served. In other words, should we understand how to mine the relationships in social media better, the potential for increasing this performance increases since people are more likely to click on an ad or be served one and respond to it when we know our trusted friends are already using or endorsing that service or product.

Using data available from Yahoo Messenger, Yahoo! mined the density of connections between a sample of users. Chaoji had a focused set of questions from Yahoo Messenger networks that he needed answers for: Do individuals wield influence over their friends in online social networks? Are highly connected individuals the same as social influencers? How far reaching is the influence in the network? Is it local to its social neighbourhood or is it global? Which targeting methods are suitable?

What he found was that a small number of highly credible or trusted influencers could indeed have a disproportionate influence on their circle of friends – depending on key 'index' users' level of connectivity, as measured by the number of people they connected to via their Messenger chat threads.

However the more important attribute was closeness within the network neighbourhood. In other words, highly “influential” users, while effective to their close by connections, will experience an exponential drop in their level of influence beyond the first hop for most of the connections. “Overall, we are more likely to trust our friends and their interests and recommendations, especially if these also happen to be the same as ours,” said Chaoji.

But how should advertisers reach these networks of friends? Another findings from the research was that the advertisements had to be non-intrusive and be blended into the sites that these people are likely to visit.

The study explored two complementary targeting/marketing approaches – direct and social neighbourhood. Direct marketing aims to target the users that are most likely to adopt a service, whereas social neighbourhood-based marketing targets the neighbourhood of likely adopter. Social targeting is more effective since it can influence a larger set of users through the homophily effect.

Yahoo! had run pilots wherein advertising and promotions for a movie, for instance, were served via social networks. The advertisement contains hooks allowing users to forward the movie trailers to external social media, such as Facebook, Google Buzz, Plurk, Twitter, and so on. Advertisements served this way through social networks shows some evidence of a greater user interaction with the creative, and a larger audience reach. Both these factors can have a direct influence on revenue.

### Trust and relationships

During the workshop, [Professor Lim Ee-Peng \(http://www.sis.smu.edu.sg/faculty/infosys/eplim.asp\)](http://www.sis.smu.edu.sg/faculty/infosys/eplim.asp) of SMU’s School of Information Systems gave a paper on rules and behaviours within “trust mining,” discovering the drivers for rules regulating networks of nodes in social networks that have reciprocal levels of trust.

Starting from the premise that people care about trust enough to use it as a parameter for decision making, Lim mines the network of trusted relationships in websites like Epinions ([www.epinions.com](http://www.epinions.com)) which uses a network of reviewers on anything from food to electronics to cars. Reviewers rate products with stars (1 to 5) and write reviews for the products, the results of which lead to users developing trust relationships with some reviewers.

“We tend to trust people we know and have a relationship with. Within the context of the anonymous web of reviews made by people we cannot see, we have to learn who to trust,” Lim noted.

According to his research, new trusted links between users are formed based on some existing trusted links. However, different sets of rules apply for the formation of distrust relationships.

Lim’s study showed, for example, that trust within social networks is transitive: in other words, if A trusts B and B trusts C, then A trusts C. But, transitivity does not work for distrust, i.e. if A distrusts B and B distrusts C, then A may not distrust C. A core reason for the transitive nature of trust in social networks is that it is propagated via each pair of trusted connections, he observed.

The power of transitivity also varies with the type of network. These relationships tend to work better in strong web trust links (for example, Web of Trust) than weak ones (for example, Twitter followers, almost all of which have no real personal relationship with the opinion leader they are following).

### Trust and “JohnTAN345”

To be sure, there are some clarifications regarding the general robustness of trust mining as a concept for discovery of rules within social media. It is well known among frequent users of sites like eBay that the system for rating the sellers was unreliable. In a trust-based system like eBay, sellers are rated on their reliability by buyers who expressed opinions on the match between what was advertised and what was delivered. In such cases, since the online identities of both buyer and seller were unknown; it allows the possibility of a single seller impersonating many instances of buyers recommending himself as a trustworthy seller.


Hence, the fact that 20 people recommended “JohnTAN345” (for illustration) as a trustworthy seller – increasing the probability that someone will buy from him next -- may be meaningless. “JohnTAN345” could have easily sent in recommendations for himself under different aliases with glowing testimonials; lending credibility to the popular adage that “on the internet, nobody knows you’re a dog!”

Nevertheless, whatever the application and area of interest, it was clear from the workshop that social media has come some way into the collective consciousness of many users in the target demographic and gaining the attention of corporate decision makers as a mean of outreach. Whatever the direction social networks will take for its development in the future, it is likely that the commercial use of it as a medium will be more likely, as well as more profitable for companies that get the right mix of intent and subtlety to keep users engaged.

[Share \(http://www.facebook.com/sharer.php\)](http://www.facebook.com/sharer.php)

[Tweet](#)

[↑ back to top \(#top\)](#)

 [back to top \(#top\)](#)

---

All materials copyright of Singapore Management University (<http://www.smu.edu.sg>) and the Wharton School (<http://www.wharton.upenn.edu>) of the University of Pennsylvania (<http://www.upenn.edu>), Privacy Policy (<http://knowledge.smu.edu.sg/privacy.cfm>).